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U.S. PATENT APPLICATION

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Invention: Improvements in Service Oriented Networks

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SPECIFICATION

TECHNICAL FIELD

This invention relates to a third generation network that provides services to end-users, services such as telephone calls, VPN, multiple access, information services, etc.

THE PROBLEM AREA

The H.323 standard of the International Telecommunication Union (ITU) specifies signalling and transport for multimedia traffic over a packet switched network. Another protocol that addresses this same issues as the H.323 standard is referred to as SIP (Session Initiation Protocol) standard.

Network solutions according to H.323 and SIP mainly and typically support multimedia communication between end-points that by some means are connected to a packet-based network, such as for instance an IP (Internet Protocol) network. Networks and end-points that support H.323 or SIP (or, are given this support via other means, such as e.g. an H.323 or SIP enabled gateway), can provide services and functions as can be found in a typical PSTN (Public Switched Telephone Network). Accordingly, depending on the capabilities of the end-point, such networks can support and provide to a user more than plain voice communication. Other examples of supported communication types are video, fax, data sharing, information services, etc.

Telecommunication solutions according to H.323 or SIP will typically support the same type of services as those provided by a normal PSTN. Such services are call forwarding, call waiting, call screening, etc. Because H.323 and SIP telecommunication solutions are using new network architectures, such as e.g. based on IP, and have support for smarter end-points than PSTN, a new sets of services will be supported in those networks.

Although H.323 and SIP are new protocols, telecommunication solutions according to those protocols will encounter problems with regard to service interaction similar to those experienced in the PSTN. A reason for the occurrence of a service interaction problem is that some services are invoked when an end-user establishes a call. This means that services are applied after some of the routing of a call is already done, which in turn can lead to adverse interaction of a service or services.

KNOWN SOLUTIONS

In the following and with reference to the accompanying fig. 1, a typical known service solution in a typical telecommunication network, as will be readily appreciated by a person skilled in the art, will be explained by way of a model description.

In figure 1 the normal network model is shown. It should be noted that the reference numerals only give an indication on the normal or typical call path flow, as other call path scenarios also are known to exist:

1: The services are configured by a network operator and potentially also by an end user
2: The call is triggered at the user side and signalling handler on the user side communicates with the signalling handler on the network side
3: The service executor is invoked
4: The service executor communicates with the service configuration part in order to download information on e.g. available services
5: The service executor returns service information to the signalling handler, that might be ordinary PSTN services like CLIP (Calling Line Identity Presentation)/CLIR (Calling Line Identity Restriction), PNP (Private Numbering Plan), OCB (Outgoing Call Barring) etc.
6: The signalling flow can be "flooded" to the terminating side (the "reflected side")
7: When the signalling part is executed, information on which media channels to set up are passed over to the media generator.

Accordingly, the media is set up through the network. Note that media and signalling usually do not follow the same paths. Note also that the "reflection plane" indicated in figure 1 illustrates that the originating side may or may not see a "mirrored" or "reflected" terminating side that is similar to the originating side.

The service configuration and service executor shown in figure 1 can also exist on the user side. The advantage of having the service configuration and service executor on the network side is that the operator is given full control over the service environment and all possible interactions between services.

United States Patent 5,822,419 to Enstone, et al., discloses a method of detecting interactions between services in a set of services in a telecommunications system. A service abstract is produced based on a Basic Call State Model (BCSM) which gives a

high level description of a Call Processing Subsystem and a data processing sequence performed by basic call processing and by the services in respect of a global data item. For detecting service interactions, a service abstract is produced based on a Basic Call State Model and a data processing sequence performed by basic call state processing and by the services in respect of a global data item.

European Patent publication no. EP0825787 to British Telecomm (GB) discloses, in a connection management system for setting up connections in a communications network, run-time negotiation is carried out to avoid feature interaction. Users of the network are provided with user agents (intelligent software) who have access to user profiles. When a calling user wants to set up a particular connection configuration, which may involve service features such as ring back later on busy, their user agent sends a connection configuration proposal to the user agent or a called user. The two user agents then negotiate to establish a mutually acceptable connection configuration, if one is available. The negotiation is based on alternative connection configurations stored in order of preference in the respective user profiles. These are proposed and counter-proposed by the user agents in descending preference order until the mutually acceptable configuration is reached or the connection fails.

Patent publication no. WO9750232 to Bell Communications Res (US) discloses a method for managing communications between a service origination node and a plurality of serving nodes where the serving nodes are simultaneously active for a particular trigger to thereby generate a reply to the service origination node. The method includes the step of determining control options for each trigger indicative of service categories by capturing service interaction principles supplied by a serving node services expert acting as a mentor. The service interaction principles are based upon a requirement of executing service categories in each of the serving nodes for each trigger. The method also includes the step of controlling execution of each of the service nodes and the service categories for the particular trigger with reference to the control options to generate the reply.

Patent publication no WO9429993 to TELEFON AB L M ERICSSON (SE), discloses a method of avoiding undesirable interferences between services in a telecommunications system that includes basic software for a basic service and supplemental software for services supplemental to the basic service. The supplemental software is divided into action software, which acts solely on the basic service, and supplemental software, which acts on the remaining supplemental software. A supplemental service is

represented by action elements. Combinations of action elements form nodes in a mathematical binomial tree. Only those combinations, which correspond to interference, i.e., an undesirable behaviour, between supplemental services will form a number of structures, called interference event trees. Before a supplemental service can be executed, its action elements are compared with nodes in the interference event trees, with the intention of ascertaining whether or not the former coincide with action elements belonging to the nodes in the latter. Only those interference event nodes whose sets of action elements are equivalent with the set of action elements of the supplemental service or a set thereof are selected. An interference event node whose set of action elements is a subset of the action elements of a node that has already been chosen cannot be selected. Interaction software belonging to selected nodes in the interference event trees is added to the basic software.

OBJECTS OF THE INVENTION.

It is an object of the invention to provide an improved solution in a modern telecommunication network for mitigation of service interaction or service conflict problems that may occur when conflicting services pertinent to a subscriber are invoked.

It is a further object of the invention to provide an improved solution in a modern telecommunication network for mitigation of network load problems resulting from service interaction or service conflict problems.

BRIEF DESCRIPTION OF THE INVENTION

By the present invention is provided a new signalling path, or a new way of starting a call, recognised in a of a system characterised by the features recited by the accompanying independent patent claim 1, a method characterised by the features recited by the accompanying patent claim 6 and a system characterised by the features recited by the accompanying patent claim 8.

Other advantageous features of the system, method and system of present invention are recited in the accompanying dependent patent claims no. 2 – 5, 7 and 9-11, respectively.

BRIEF DESCRIPTION OF THE DRAWINGS.

Figure 1. is a schematic drawing illustrating a typical known call path scenario, with sequence illustrated by numbers

Figure 2. is a schematic drawing illustrating an exemplary call path scenario according to the invention.

DETAILED DESCRIPTION OF EMBODIMENTS.

In the following the invention will be explained in more detail, by way of example and with reference to the accompanying drawings.

Referring to figure 2, instead of starting call from the signalling layer and through the media layer as is common according to current solutions as illustrated in figure 1, in a solution according to the invention the call is started at the service layer. This means that the service layer on the user side and the service layer on the network side will communicate directly. It will then be the service layer on the network side that informs the signalling handler on the signalling layer on the network side to establish the call. After the service executor on the originating side has been informed about the destination of the call and has performed applicable local services, it routes the call to the service executor on the destination side. When the destination side service executor has finished executing it's services, dependent upon network architecture, either the originating side service executor or the destination side executor will inform the media executor to start the call.

In reference numeral order, in the following is given a detailed explanation of the various items shown in figure 2. As different call path scenarios can exist in a solution according to the present invention, it should be noted that the order in which of the references numerals appear only give an indication of one of a number of possible call path flows, that is likely to occur:

1: The services are configured by a network operator, and possibly also by an end user
2: The call is triggered at the user side and the associated service executor on the network side is informed
3: The service executor communicates with the service configuration part in order to download available information, such as e.g. information on available services.

4: The service information can be flooded to the terminating (destination) side (i.e. the "reflected" side.)

It should be noted, that, in a solution according to the invention, the signalling handlers and generators are eliminated on the network side as well as on the user side. They are not needed because call routing and transport of service information is done on the service layer.

Although the Signalling handler, the media generator and the media handler shown in figure 2 are depicted by dotted lines, they are still present. They are, however, involved in the service execution. When one or more services are executed at the Service Executors, the service executors inform the signalling handler at the network side to initiate the call (point 4 in figure 2), but the rest of the call set-up follows the normal procedure as described in the applicable standard call control protocol (e.g. H.323 or SIP). Accordingly, in the actual call handling between, the difference between the solutions indicated by figures 1 and 2, respectively, is that in figure 2 it is only the signalling handler at the network side that is allowed to initiate calls, such as e.g. sending Q.931 "Set-up" according to H.323 or "SIP-Invite" according to SIP.

Further, with reference to fig. 2, after the Service executor has informed the signalling handlers to initiate the call in step 4, the signalling handlers at the network side initiate the call towards the signalling handler at the user side (step 5 in figure 2). The signalling protocol can be of any standard type (e.g. H.323 or SIP), adapted such that the call initiation is only allowed from the network side. When the signalling is complete, the signalling handler informs the media handler that it is able to receive or send information, as indicated in step 6. Both the network and the user side are now ready to receive media, as indicated in step 7.

Referring to the solution illustrated in figure 2, and comparing it with the known solution illustrated in figure 1, it can be seen that the novel solution further represents an extension represented by a service handler. As depicted, the service handler represents the users access to the network, and represents the point at which the user will initiate a call. Because a call, in the novel solution, is considered equal to any other service, and hence is separated from the actual signalling that is used to establish calls, a requirement for this is that the service handler is able to communicate with the network side service handler over a simple standard protocol, such as for example HTTP (hypertext transport protocol). Accordingly, the service handler at the user side does not communicate with the signalling handler at the user side.

The service executor at the network side in a solution according to the invention, of which an exemplary model representation is illustrated by figure 2, can be seen to differ in two ways from the service executor shown in figure 1:

a) The service executor (shown in Figure 2) receives service-triggering information directly from a service handler located at the user side instead of a triggering service from the signalling handler at the network side. That means that the service executor at the network side must have support for a protocol that is understood by the service handler at the user side. A simple protocol like http should be used.

b) The service executor at one network talks directly with a service executor in another network (in this context and at this point, the meaning of network is the service executor handling services for a different user or domain), instead of communicating indirectly through the standard call control signalling (as shown in Figure 1). The protocol used between the different service executors should be optimised according to the services that are supported. Because most of the information sent on this communication link is data related, a data protocol will be used, where XML (extended Mark-up Language) over http could be one example of such a protocol.

In figure 2, the new scenario in a solution according to the invention is drawn by solid lines. However, the novel way of invoking services may still invoke *"old"* services of existing solutions, which can be included , as shown, by the features illustrated in figure 2 by dotted lines. If "old" services are invoked, the service executor preferably is designed with a backend and different frontends, depending on which protocol to interface to.

If several networks provided by different network providers or ISPs are involved, there must exist some standard protocols on the service layer; see reference numeral 3 in figure 2.

The protocols used for configuring the services as well as on the service execution layer typically can advantageously be HTTP.

ADVANTAGES

- Provides a solution to the service interaction problem.

- Eliminates the need for standardising the way originating and terminating services are "talking" to each other, as they communicate directly and not via the media layer.
- Eliminates the need for a special and often quite complex call handling protocol.

ABBREVATIONS

IP	Internet Protocol
ISP	Internet Service Provider
LAN	Local Area Network
PSTN	Public Switched Telephone Network
VPN	Virtual Private Network
WAN	Wide Area Network
WAP	Wireless Application Protocol
WML	Wireless Mark-up Language

REFERENCES

[1] ITU-T Recommendation H.323, 02/98 "Packet-based multimedia communications system".

[2] WAP white paper, June 99, http://www.wapforum.org/what/WAP_white_pages.pdf .

[3] Session Initiation Protocol – SIP IETF RFC 2543, http://www.ietf.org .